

ing in the garden, the original tree which stood outside having been cut down many years ago by mistake. After inspecting the house and the cypress, the party scattered, roaming through the grounds at pleasure, noting the great variety of trees and shrubs which Bartram had collected in his travels from Ontario to Florida.<sup>1</sup>

The return to the station was along a better road than the first one traversed, and toward train time the party gathered on the steps of the station to chat over the delightful pilgrimage, soon completed by the homeward ride.

---

### A Hybrid Grass.<sup>2</sup>

BY DR. GEO. VASEY.

In a low meadow on the banks of Hunting creek, near where it empties into the Potomac river, a mile below Alexandria, Va., I found, the present season, *Trisetum palustre*, L. and *Eatonia Pennsylvanica*, Gr. I was surprised, and puzzled also by finding growing with these grasses another, which was evidently intermediate between them. The field covered several acres, and there was an abundance of specimens of all kinds, although the *Trisetum* was mostly out of flower, and, to a considerable extent, had dropped its seed. A careful survey of the circumstances led me to the conclusion that the intermediate form was a true and spontaneous hybrid between the *Trisetum* and *Eatonia*. At first thought this would seem to be improbable, if not impossible, as the two grasses belong to different genera, which in some of the classifications are rather widely separated. A careful examination, however, led me to the conclusion that these genera are closely related, and that the intermediate specimens were truly hybrids between the two species named. The close relationship between *Koeleria* and *Eatonia* is very evident, the two species of the latter genus having been included in *Koeleria* previous to the construction of the genus *Eatonia* by Rafinesque. Both species had, however, been placed in *Aira* by Muhlenberg. Moreover, Dr. Hooker, in the Handbook of the New Zealand Flora, places both *Koeleria* and *Trisetum* in the section *Avenaceæ*, and the

---

<sup>1</sup>An account of Bartram's life, travels, and garden may be found in Harper's Magazine for February, 1880.

<sup>2</sup>Paper read before the Botanical Club of the A. A. A. S., Philadelphia, 1884.

same relationship is maintained by European agrostologists. Even in Bentham and Hooker's *Genera Plantarum*, where the two genera are placed in different sections, there is one group of *Kæleria* described, in which the flowering glume is short-awned, several species of which group were by Trinius placed in *Trisetum*.

As to the two species named, *Trisetum palustre* and *Eatonia Pennsylvanica*, it may be said that both grow in similar situations, both have the same general habit and appearance, growing to about the same height, with similar foliage, and the same kind of long, narrow and loose panicle. Both have about two flowers in the spikelet, the outer glumes are very similar in form, texture, nervation and relative size, and nearly the same may be said as to the flowers.

When we come to minutia, however, there are differences. The spikelets of *Eatonia* are about  $1\frac{1}{2}$  lines long, the obovate upper glume about 1 line long; the lower flower is about  $1\frac{1}{4}$  lines long, the upper one about 1 line, both linear and obtusish. The axis connecting the flowers is smooth or nearly so. In *Trisetum* the spikelet is about 3 lines long, the obovate-lanceolate upper glume about 2 lines long, with scarious margins, the lower flower 2 to  $2\frac{1}{2}$ , and the upper slightly shorter; and the upper flower has a bent awn 2 to 3 lines long, proceeding from the apex between the two acuminate lateral teeth, the lower flower being unawned or barely mucronate. The flowering glumes are linear-lanceolate and 3 nerved, the lateral nerves indistinct below. The axis connecting the flowers is sparingly hairy.

Examining now the intermediate or hybrid form, we find the spikelets about 2 lines long, the outer glumes about  $1\frac{1}{2}$  lines, the lower one linear-lanceolate, acute, 3 nerved; the upper glume is obovate-oblong, acute, 3 nerved, with scarious margins. The flowering glumes are linear,  $1\frac{1}{4}$  to  $1\frac{3}{4}$  lines long, 3 nerved, the lateral nerves obscure; the lower flower is acute or acutish, the upper one with 2 *short* lateral teeth, and an awn about 1 line long. The axis is slightly hairy, less so than in *Trisetum*.

In all these characters there is an intermediate gradation of the two species.

The finding of these hybrid specimens recalled to my memory the fact that 7 or 8 years ago, I found, mixed with specimens of *Eatonia Pennsylvanica* collected by Mr. A. H. Curtiss in South Carolina, almost exactly the same hybrid form, although I did not then realize their relationship.

The conclusion which I draw from these cases is that *Eatonia* and *Trisetum* are very closely related, and should both be in the section *Avenaceæ*, as also should some species of the genus *Grappheporum*.

NOTES<sup>1</sup> BY F. L. SCRIBNER.—The above paper, in which Dr. Vasey details a discovery made by himself, describes an undoubted instance of hybridization between *Trisetum palustre* and *Eatonia Pennsylvanica*.



Fig. 1. *Trisetum palustre*. Fig. 2. Hybrid between the preceding and the following. Fig. 3. *Eatonia Pennsylvanica*. Figs. 4 and 5. *Grappheporum melicoides*.

Figures 1, 2 and 3 are magnified drawings of the spikelets of the three forms in question, all enlarged to the same scale, showing the relative size and proportions of the various parts. Figure 2, the spikelet of the "hybrid," it will be seen, is intermediate in size between the *Trisetum* and *Eatonia*, illustrated by Figures 1 and 3, respectively. In general shape and texture of the outer glumes and florets it resembles the last named, but the flowering glumes are awned as in the *Trisetum*. Whether the

<sup>1</sup>Remarks made at the reading of the paper, prepared by the author and sanctioned by Dr. Vasey.

seeds of this "hybrid" are fertile or whether it produces seeds at all was not stated.

This discovery of Dr. Vasey's is an exceedingly interesting one, and apparently fixes the position of the genus *Eatonia* in the Avenaceous group, as indicated by Dr. V., along with *Trisetum*, to which genus it was once, and as now appears very properly, referred by Trinius. If we examine the synonymy of this grass—*Eatonia*—we find that Dr. Vasey's paper confirms the opinion of the older botanists as to its position: Michaux, Pursh, Sprengel, Muhlenberg and Willdenow placing it in *Aira*, Desveau and Roemer and Schultes in *Airopsis*. Beauvois doubtfully referred it to *Poa*, and Kunth founded upon it the genus *Reboulea*, placing it in *Poaceæ* along with *Glyceria*, and this classification has been followed by Dr. Gray and by Mr. Bentham.

Dr. Vasey alludes to the very evident Avenaceous character of certain species of *Graphephorum*, referring to *G. melicoides* and *G. Wolfii* (*Trisetum Wolfii*, Vasey in Wheeler's Report). Figure 4 represents a spikelet of *G. melicoides*. Like *Trisetum palustre* it is two-flowered, with a similar prolongation of the rhachilla above the second floret; there is a like inequality of size in the empty glumes, and the hairiness of the rhachilla differs only in degree, and, although the flowering glume is awnless in the typical form, we occasionally find samples that are short-awned, as represented in Fig. 5.

*Graphephorum Wolfii* presents some specific differences in habit, and has a narrow and more densely flowered panicle, but the spikelets are very similar to *G. melicoides* in all their parts, differing chiefly in being three, or, in the more robust forms (*Trisetum Brandegei*, Scribn.), four-flowered, with the flowering glume constantly short-awned. Prof. Thurber, in the Botany of California, referred this grass to *Trisetum subspicatum* (*T. subspicatum*, var. *muticum*), while another well-known botanist referred samples of it to *Graphephorum melicoides*. Dr. Vasey himself thought at one time that it might be only a variety of the last-named species. In respect to other species of the genus *Graphephorum*, as it now stands, I would like to quote from a letter from Dr. Vasey dated April, 1881, and I hope the Doctor will pardon me for taking this liberty when I say that I heartily second the views he expresses:

"*Graphephorum fulvum* and *pendulinum* I would restore to *Colpodium*, and place next *Glyceria*. *Graphephorum festucaceum* I would call *Fluminia arundinacea*, Fries., and think it belongs to the group *Festucaceæ*.

"*Grappheporum flexuosum*, only doubtfully referred to *Grappheporum* by Prof. Thurber, is neither one nor the other, but a good genus.

*Grappheporum melicoides* should be *Trisetum melicoides*, or if a genus (*Grappheporum*) be made for it, it should come next to *Trisetum* or *Avena*, for it is evidently Avenaceous."

## The Fossil Flora of the Globe.<sup>1</sup>

BY LESTER F. WARD.

HISTORICAL VIEW.—The writers of antiquity make no mention of any form of vegetable petrification. The earliest allusion to the subject was made by Albertus Magnus in the thirteenth century. Agricola and Gesner treated of petrified wood in the sixteenth century. The first mention of any kind of vegetable impression in the rocks was made by Daniel Major, of Jena, in 1664. In 1699 Edward Lhwyd, of London, wrote an extensive treatise on such impressions. He maintained that they were the remains of plants that had perished in the Noachian deluge. In 1709 Scheuchzer, of Switzerland, defended this view in his "Herbarium Diluvianum," a large work, in which he described and figured many fossil plants, referring them to species living in Europe. In 1718 this author went so far as to classify the fossil plants according to the system of Tournefort. In 1723 he published a new edition of the "Herbarium Diluvianum," into which he introduced this classification, and enumerated 445 species. A powerful reaction against this method followed; comparisons with living plants were carefully made, which failed to establish the identity of the fossils. The idea of their exotic origin was thereupon suggested, and for a time prevailed, but towards the close of the eighteenth century this in turn gave way to the true view of the existence of the former geologic periods with floras of their own differing from that of the present. Baron von Schlotheim headed this new school, and was followed by Count Sternberg and Adolphe Brongniart, who jointly founded the science of vegetable paleontology in the first quarter of the present century.

The first attempt to place it upon the footing of a systematic

<sup>1</sup>Abstract, prepared by the author, of a paper read before the A. A. A. S., Philadelphia, 1884.